

What is claimed is:

Sub A3/ 5 1. A vertical cavity surface emitting laser (VCSEL), comprising:

at least one quantum well having a depth of at least 40 meV and comprised of InGaAsSbN;

10 barrier layers sandwiching said at least one quantum well; and

confinement layers sandwiching said barrier layers.

15 2. The VCSEL of claim 1 wherein said barrier layers are comprised of GaAsP.

3. The VCSEL of claim 1 wherein said confinement layers are further comprised of AlGaAs.

20 4. The VCSEL of claim 2 wherein said confinement layers are further comprised of AlGaAs.

5. The VCSEL of claim 3 wherein said barrier layers are further comprised of AlGaAs.

25 6. The VCSEL of claim 1 wherein said barrier layers are comprised of AlGaAs.

Sub A4/ 30 7. The VCSEL of claim 1 wherein said at least one quantum well further comprises >1% N added to the quantum well(s).

8. The VCSEL of claim 7 wherein said barrier layers are comprised of GaAsP.

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5 9. The VCSEL of claim 7 wherein said confinement layers are comprised of AlGaAs.

10. The VCSEL of claim 8 wherein said confinement layers are comprised of AlGaAs.

10 11. The VCSEL of claim 7 wherein said barrier layers are comprised of AlGaAs.

12. The VCSEL of claim 9 wherein said barrier layers are comprised of AlGaAs.

15 13. The VCSEL of claim 1 wherein said quantum well is up to and including 50 Å in thickness.

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20 14. The VCSEL of claim 13 wherein said barrier layers are comprised of GaAsP.

15. The VCSEL of claim 13 wherein said confinement layers are further comprised of AlGaAs.

25 16. The VCSEL of claim 14 wherein said confinement layers are further comprised of AlGaAs.

17. The VCSEL of claim 15 wherein said barrier layers are further comprised of AlGaAs.

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18. The VCSEL of claim 13 wherein said barrier layers are comprised of AlGaAs.

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19. The VCSEL of claim 13 wherein said at least one quantum well further comprises >1% N added to the quantum well(s).

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20. The VCSEL of claim 19 wherein said barrier layers are comprised of GaAsP.

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21. The VCSEL of claim 19 wherein said confinement layers are comprised of AlGaAs.

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22. The VCSEL of claim 20 wherein said confinement layers are comprised of AlGaAs.

23. The VCSEL of claim 19 wherein said barrier layers are comprised of AlGaAs.

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24. The VCSEL of claim 21 wherein said barrier layers are comprised of AlGaAs.

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25. A vertical cavity surface emitting laser (VCSEL), comprising:  
at least one quantum well having a depth of at least 40 meV and  
comprised of InGaAsSbN;

barrier layers sandwiching said at least one quantum well; and

AlGaAs confinement layers sandwiching said barrier layers.

26. The VCSEL of claim 1 wherein said barrier layers are comprised of GaAsP.

27. The VCSEL of claim 3 wherein said barrier layers are comprised of AlGaAs.

28. The VCSEL of claim 1 wherein said barrier layers are comprised of AlGaAs.

29. The VCSEL of claim 13 wherein said at least one quantum well further comprises >1% N added to the quantum well(s).

30. The VCSEL of claim 17 wherein said barrier layers are comprised of GaAsP.

31. The VCSEL of claim 17 wherein said barrier layers are comprised of AlGaAs.

32. The VCSEL of claim 25 wherein said quantum well is up to and including 50 Å in thickness.

33. A vertical cavity surface emitting laser (VCSEL), comprising:  
at least one quantum well having a depth of at least 40 meV and comprised of InGaAsSbN;

AlGaAs barrier layers sandwiching said at least one quantum well; and

AlGaAs confinement layers sandwiching said barrier layers.

B1 34. The VCSEL of claim 33 wherein said quantum well is up to and including 50 Å in thickness.

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